

## CLAIMS

1. A device for detecting a mass of a flowing fluid, the device comprising:  
a housing positionable within a fluid carrying duct having a fluid sampling portion and a circuit cavity portion, wherein the fluid sampling portion includes a flow passage;

a nozzle in fluid communication with the flow passage, wherein the nozzle has a plurality of longitudinally converging elliptical side surfaces that terminate at a nozzle exit;

an electrical element disposed in the flow passage at the nozzle exit; and

a circuit module in communication with the first electrical element and disposed in the circuit cavity portion for detecting a change in an electrical property of the electrical element, wherein the detected change in the electrical property is used to determine the mass of the flowing fluid.

2. The device of claim 1 further comprising, a second electrical element disposed on the housing external of the flow passage.

3. The device of claim 2 wherein the second electrical element is used for temperature correction.

4. The device of claim 1 further comprising, a cover attachable to the housing for enclosing the fluid sampling portion and the circuit cavity portion.

5. The device of claim 1 further comprising, a heat sink in thermal communication with the circuit module for dissipating heat emanating from the circuit module.

6. The device of claim 1 further comprising, a wedge deflector integrally attached to the housing for creating a low pressure area at an outlet of the flow passage.

7. The device of claim 1 further comprising, a third electrical element disposed on the housing external of the flow passage.

8. The device of claim 7 wherein the third electrical element is used for determining a fluid temperature at the housing.

9. The device of claim 7 wherein the third electrical element is a thermister.

10. A device for detecting a mass of a flowing fluid, the device comprising:  
a housing positionable within a fluid carrying duct having a fluid sampling portion and a circuit cavity portion, wherein the fluid sampling portion includes a flow passage;

a nozzle in fluid communication with the flow passage, wherein the nozzle has a plurality of longitudinally converging elliptical side surfaces that terminate at a nozzle exit;

a first electrical element disposed in the flow passage at the nozzle exit;

a second electrical element supported by the housing external of the flow passage; and

a circuit module in communication with the first and second electrical elements and disposed in the circuit cavity portion for detecting a change in an electrical properties of the first and second electrical elements, wherein the detected change in the electrical properties are used to determine the mass of the flowing fluid.

11. The device of claim 10 wherein the second electrical element is used for temperature correction.

12. The device of claim 10 further comprising, a cover attachable to the housing for enclosing the fluid sampling portion and the circuit cavity portion.

13. The device of claim 10 further comprising, a heat sink in thermal communication with the circuit module.
14. The device of claim 10 further comprising, a wedge deflector integrally attached to the housing for creating a low pressure area at an outlet of the flow passage.
15. The device of claim 10 further comprising, a third electrical element disposed on the housing external of the flow passage.
16. The device of claim 15 wherein the third electrical element is used for determining a fluid temperature at the housing.
17. The device of claim 15 wherein the third electrical element is a thermister.